SIGCOMM 2017 Topic Preview

Routing and Outages

Thursday afternoon

12:30pm - 2:00pm Lunch (Centennial Terrace)

2:00pm - 3:15pm Technical Session 10 - Peering

Q&A | Live Streaming

Session Chair: Laurent Vanbever *(ETH Zurich)*
Room: Centennial Hall

Engineering Egress with Edge Fabric: Steering Oceans of Content to the World — Paper
Brandon Schlinker *(Facebook / University of Southern California)*, Hyojeong Kim and Timothy Cui *(Facebook)*, Ethan Katz-Bassett *(University of Southern California / Columbia University)*, Harsha V. Madhyastha *(University of Michigan)*, Italo Cunha *(Universidade Federal de Minas Gerais)*, and James Quinn, Saif Hasan, Petr Lapukhov, and Hongyi Zeng *(Facebook)*

Taking the Edge off with Espresso: Scale, Reliability and Programmability for Global Internet Peering — Paper
Kok-Kiong Yap, Murtaza Motiwala, Jeremy Rahe, Steve Padgett, Matthew Holliman, Gary Baldus, Marcus Hines, Taeeun Kim, Ashok Narayanan, Ankur Jain, Victor Lin, Colin Rice, Brian Rogan, Arjun Singh, Bert Tanaka, Manish Verma, Puneet Sood, Mukarram Tariq, Matt Tierney, Dzevad Trumic, Vytautas Valancius, Calvin Ying, Mahesh Kallahalla, Bikash Koley, and Amin Vahdat *(Google)*

Detecting Peering Infrastructure Outages in the Wild — Paper
Vasileios Giotsas *(CAIDA / UCSD)*, Christoph Dietzel *(TU Berlin / DE-CIX)*, Georgios Smaragdakis *(MIT/TU Berlin)*, Anja Feldmann *(TU Berlin)*, Arthur Berger *(MIT/Akamai)*, and Emile Aben *(RIPE NCC)*

3:15pm - 3:45pm Coffee Break

Room: Foyer

3:45pm - 5:00pm Technical Session 11 - Routing

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Session Chair: Michael Schapira *(Hebrew University of Jerusalem)*
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SWIFT: Predictive Fast Reroute — Paper
Thomas Holterbach *(ETH Zürich; CAIDA UC San Diego)*, Stefano Vissicchio *(University College London)*, Alberto Dainotti *(CAIDA, UC San Diego)*, and Laurent Vanbever *(ETH Zürich)*

Bootstrapping evolvability for inter-domain routing with D-BGP — Paper
Raja R. Sambasivan *(Boston University)*, David Tran-Lam and Aditya Akella *(University of Wisconsin-Madison)*, and Peter Steenkiste *(Carnegie Mellon University)*

The Impact of Router Outages on the AS-level Internet — Paper
Matthew Luckie *(University of Waikato)* and Robert Beverly *(Naval Postgraduate School)*

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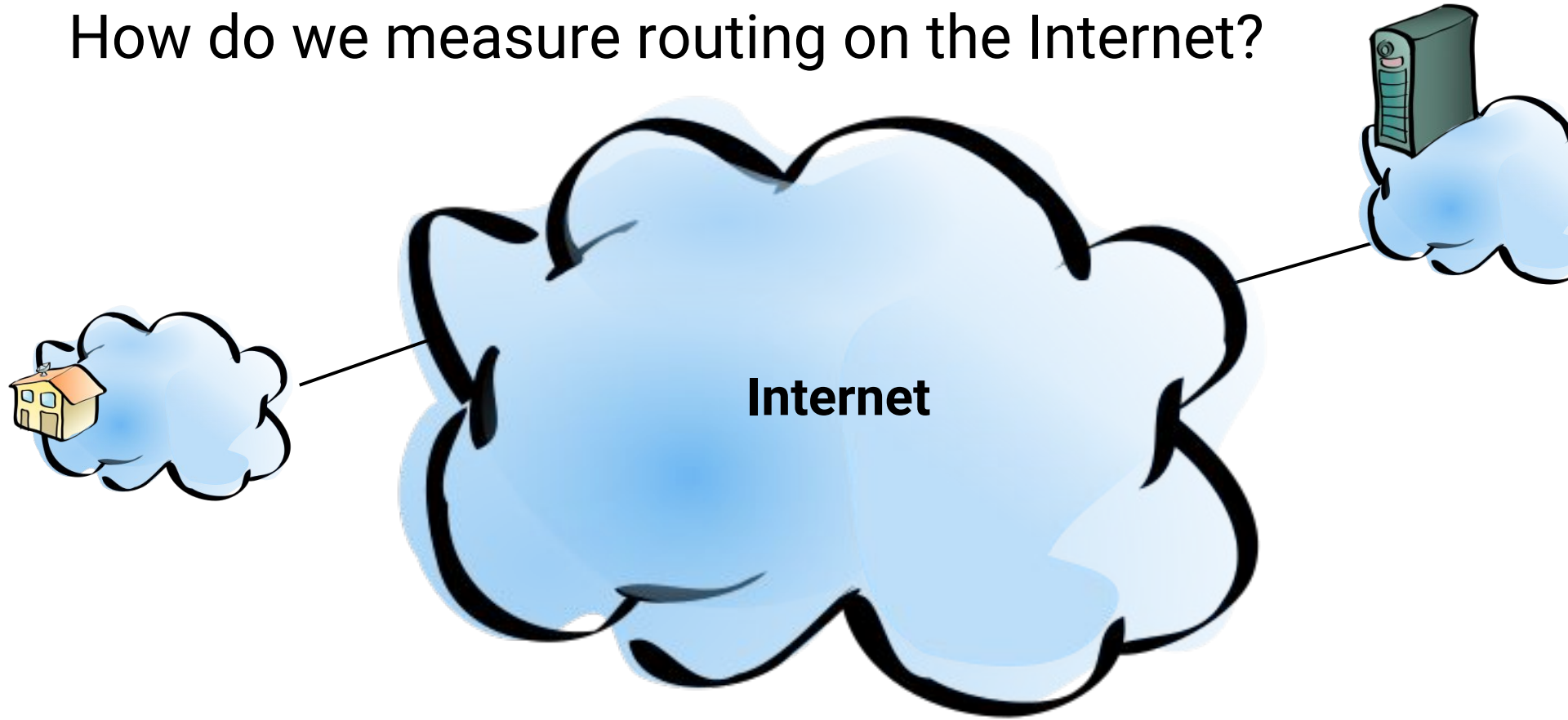
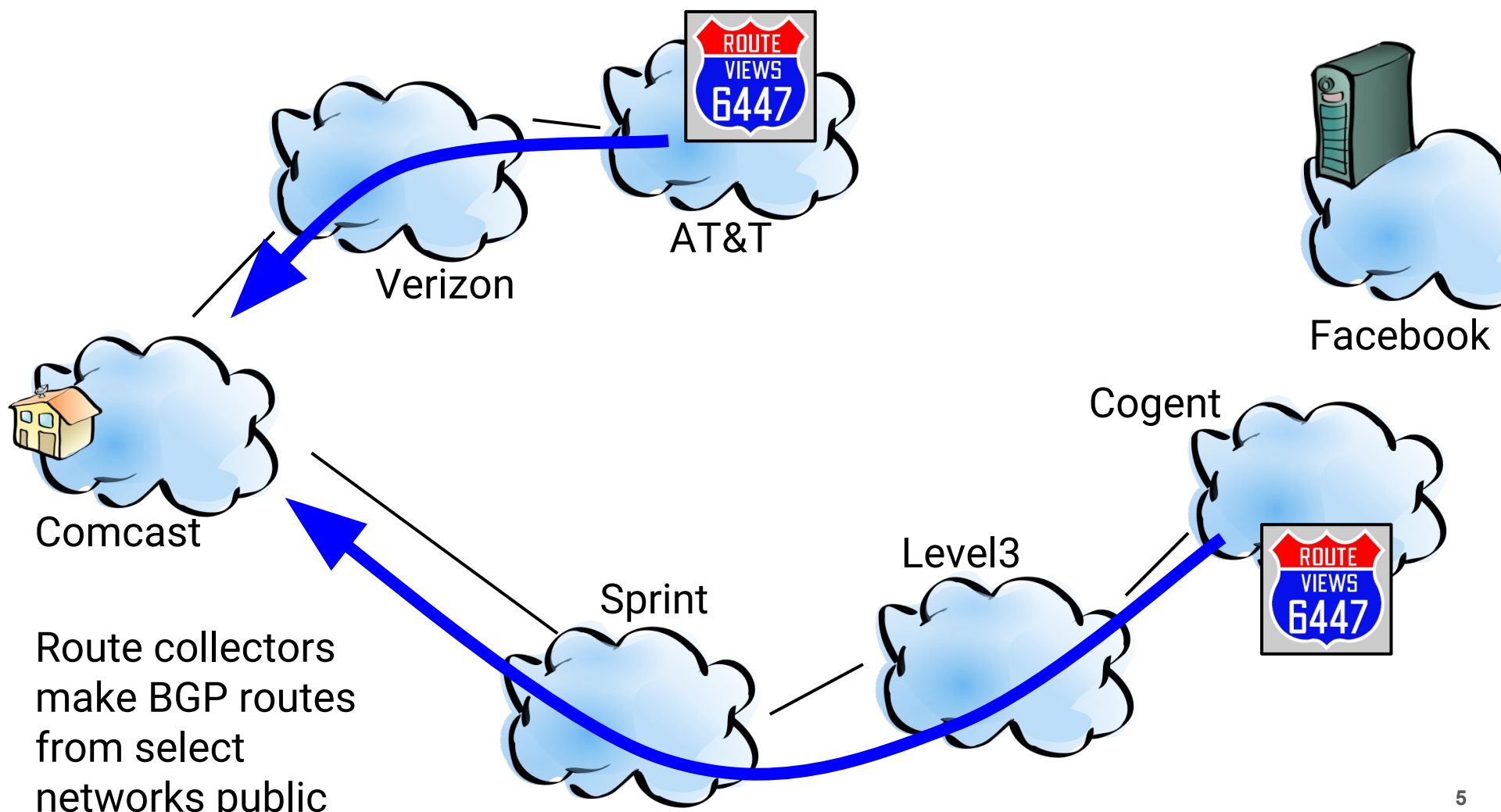
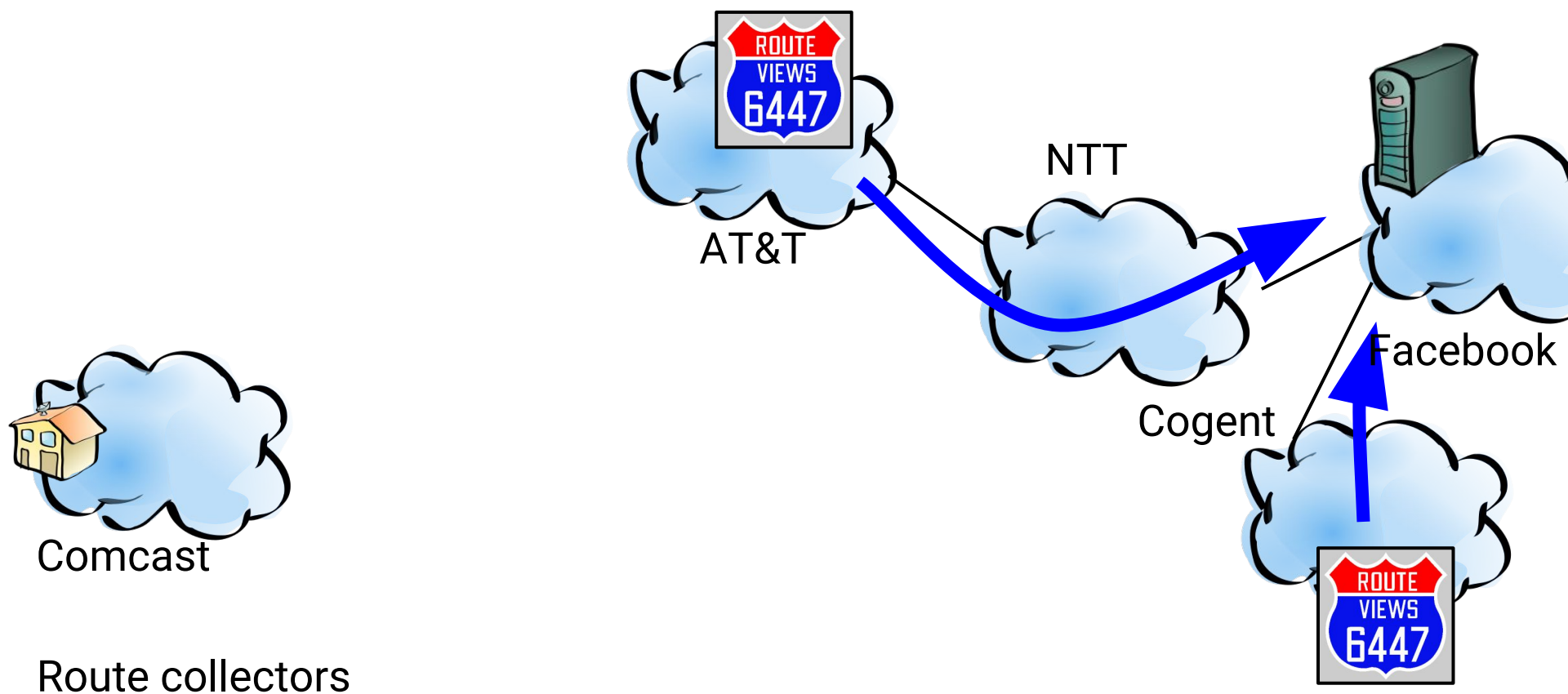
How do we measure routing on the Internet?





Route collectors make BGP routes from select networks public



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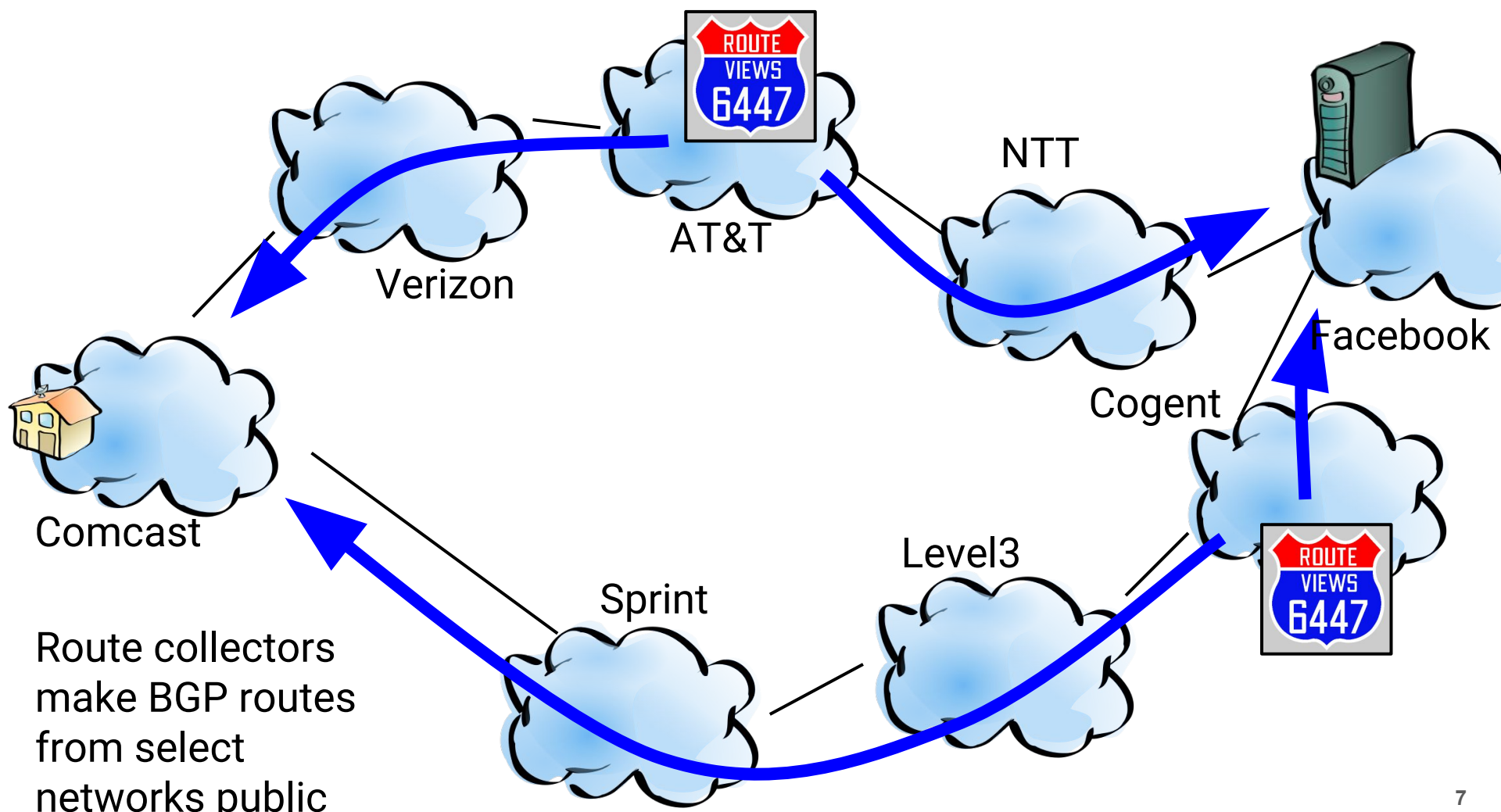

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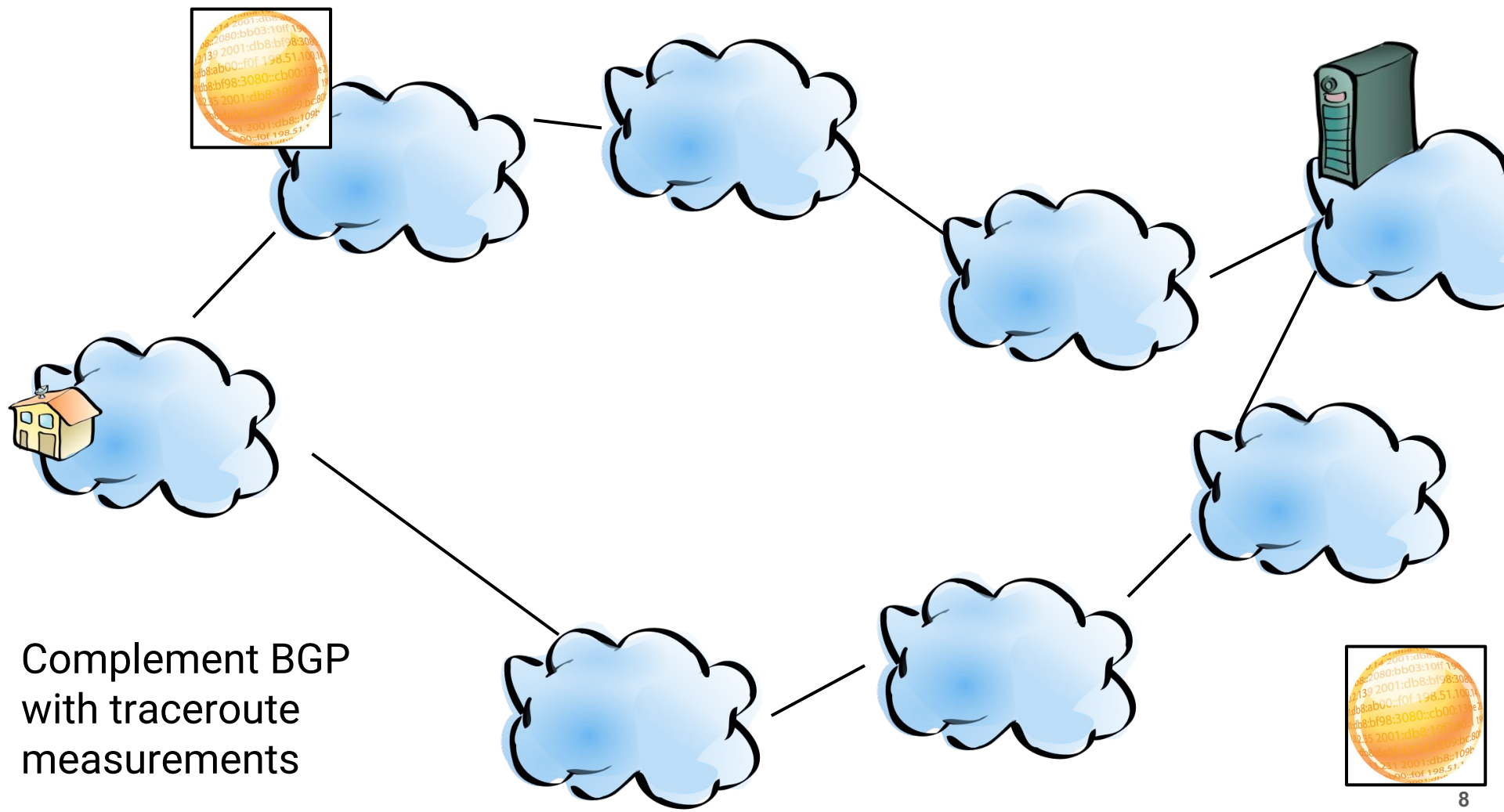
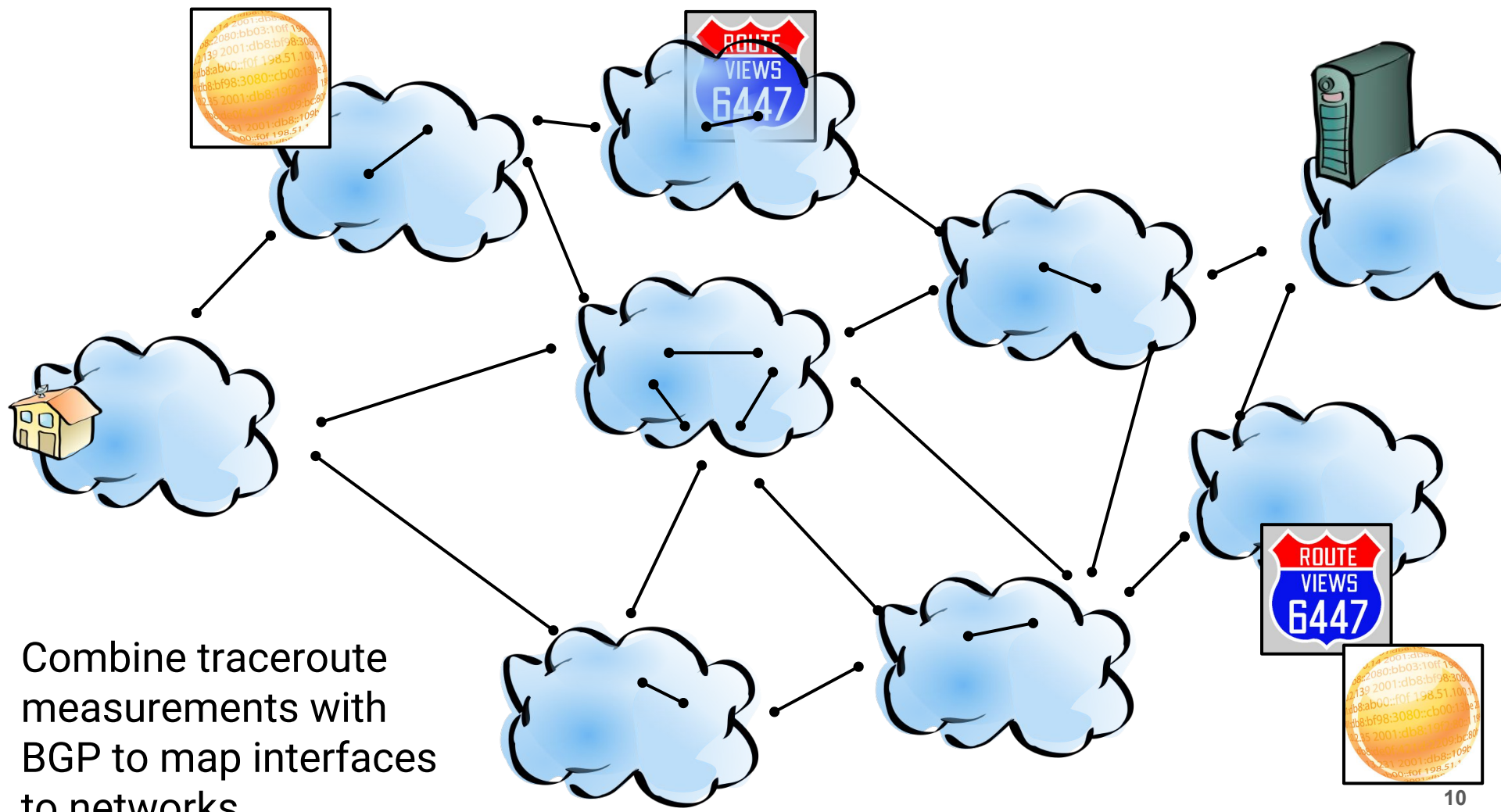
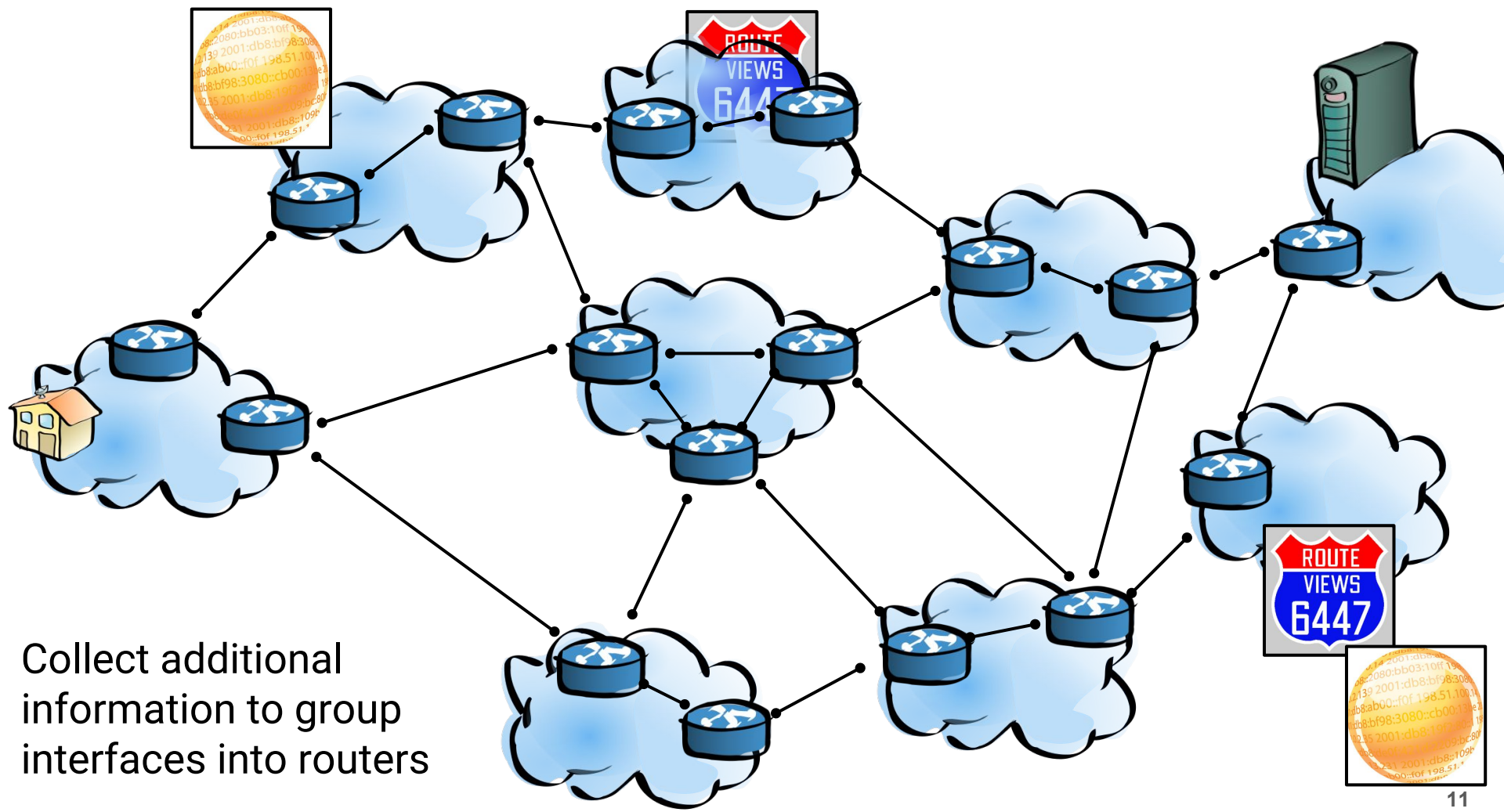


Complement BGP with traceroute measurements

Collect sequences of interfaces and links on many routes

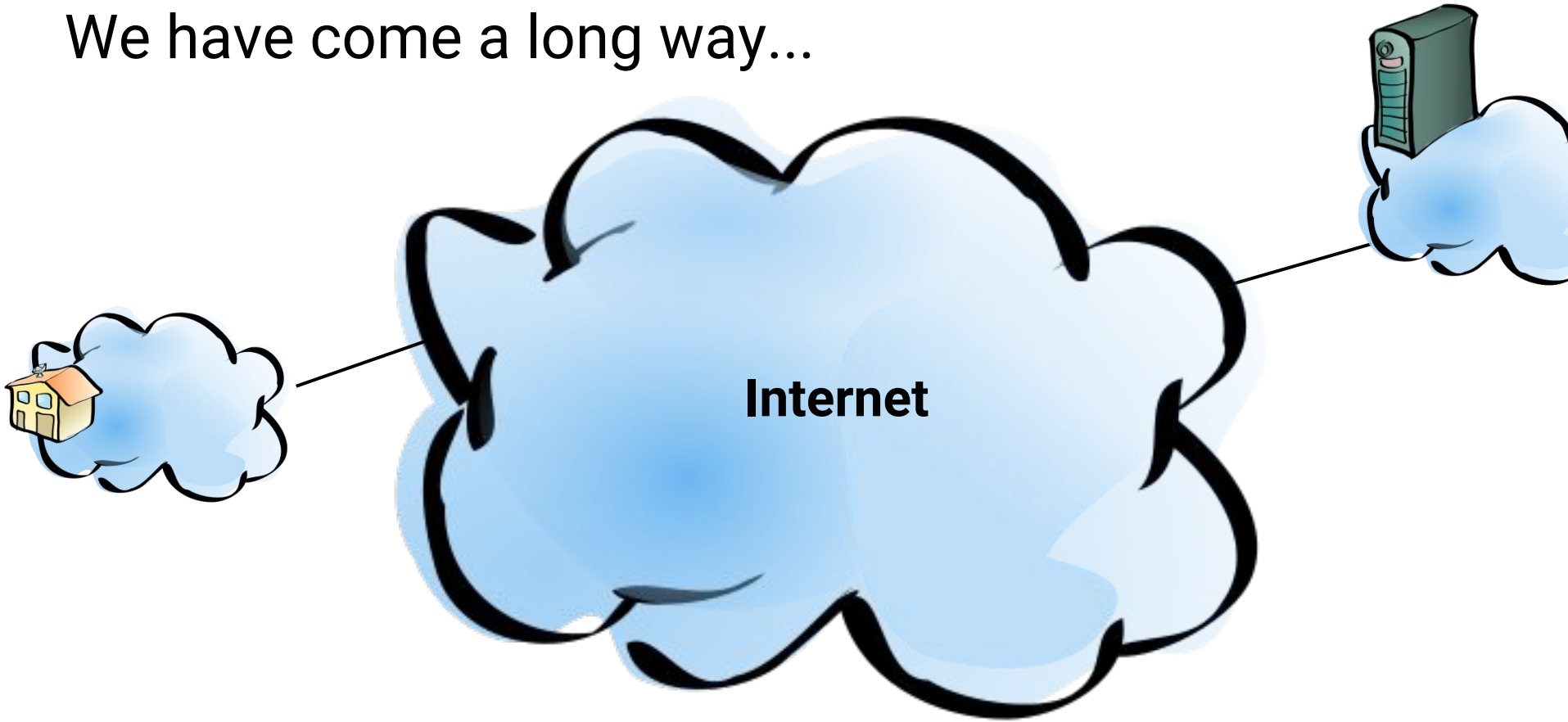


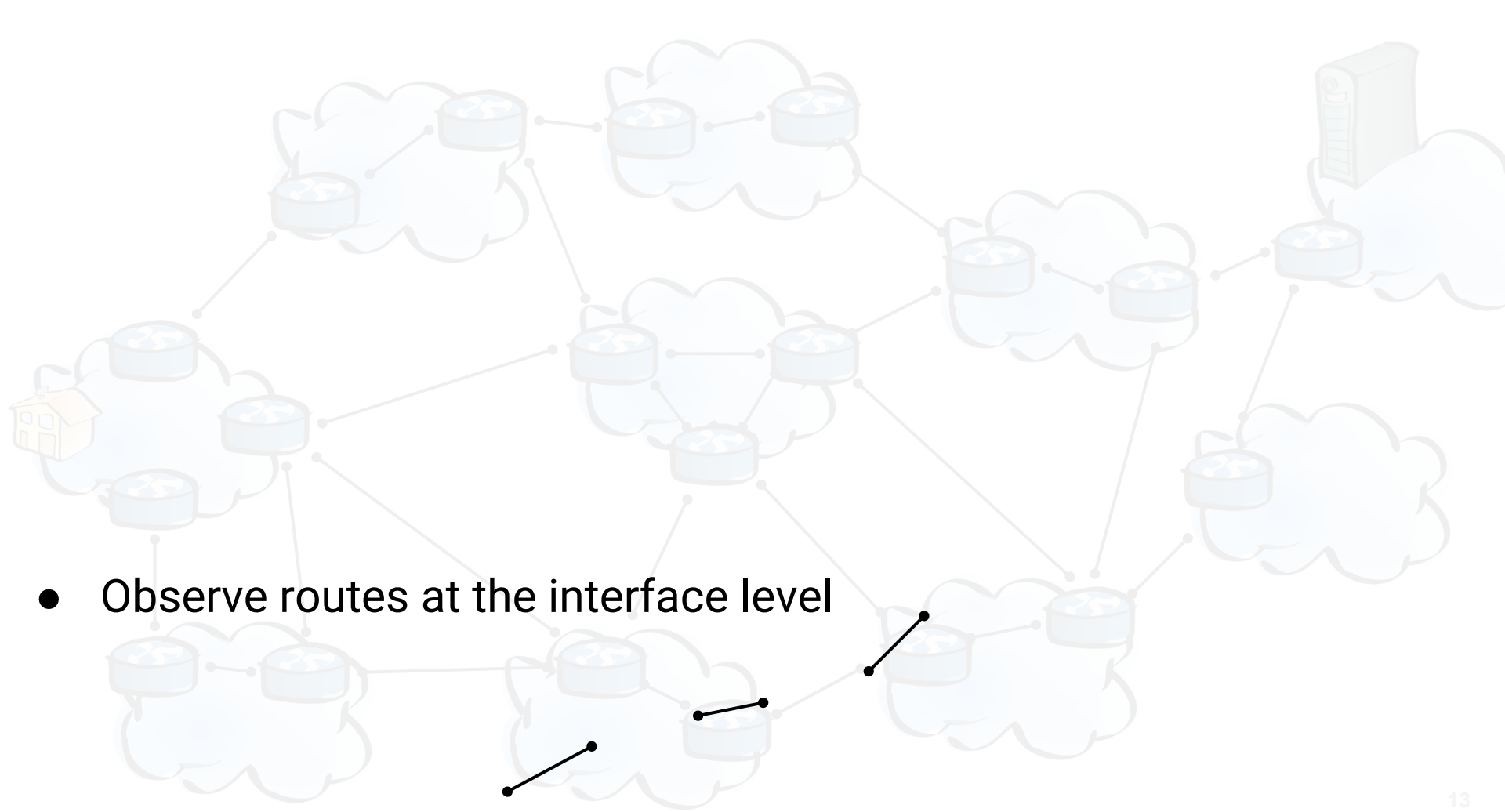
Combine traceroute measurements with BGP to map interfaces to networks



Collect additional information to group interfaces into routers

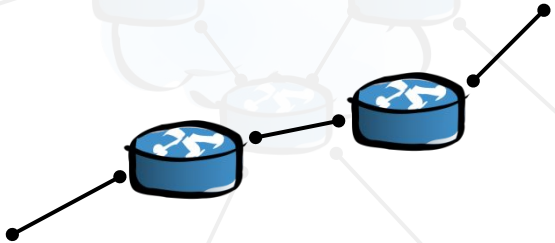
We have come a long way...





- Observe routes at the interface level

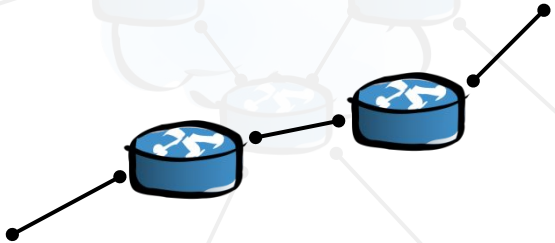
- Group interfaces into routers (router level route)



- Observe routes at the interface level

- Observe networks at each route from BGP feeds

- Group interfaces into routers (router level route)



- Observe routes at the interface level

Detecting Peering Infrastructure Outages in the Wild

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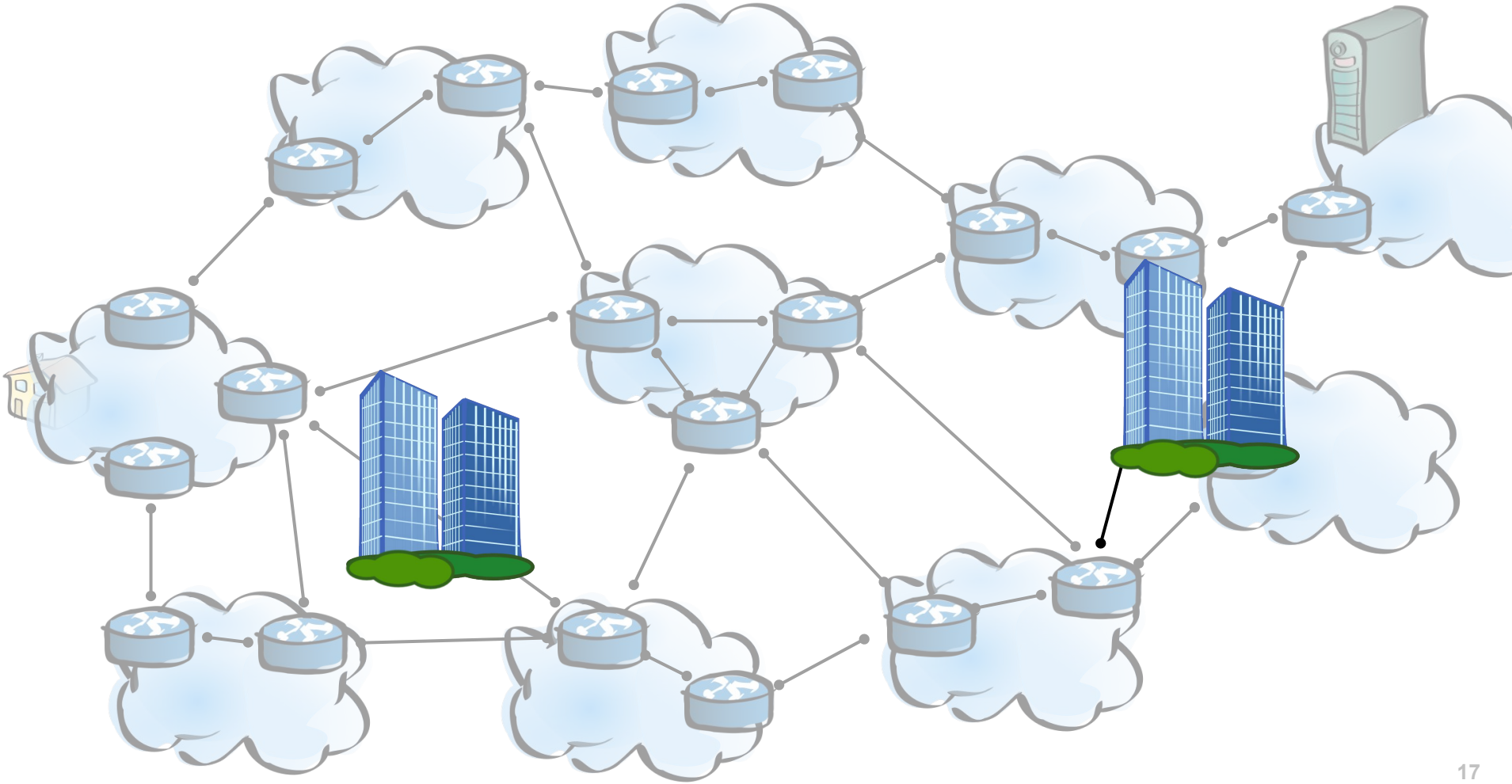

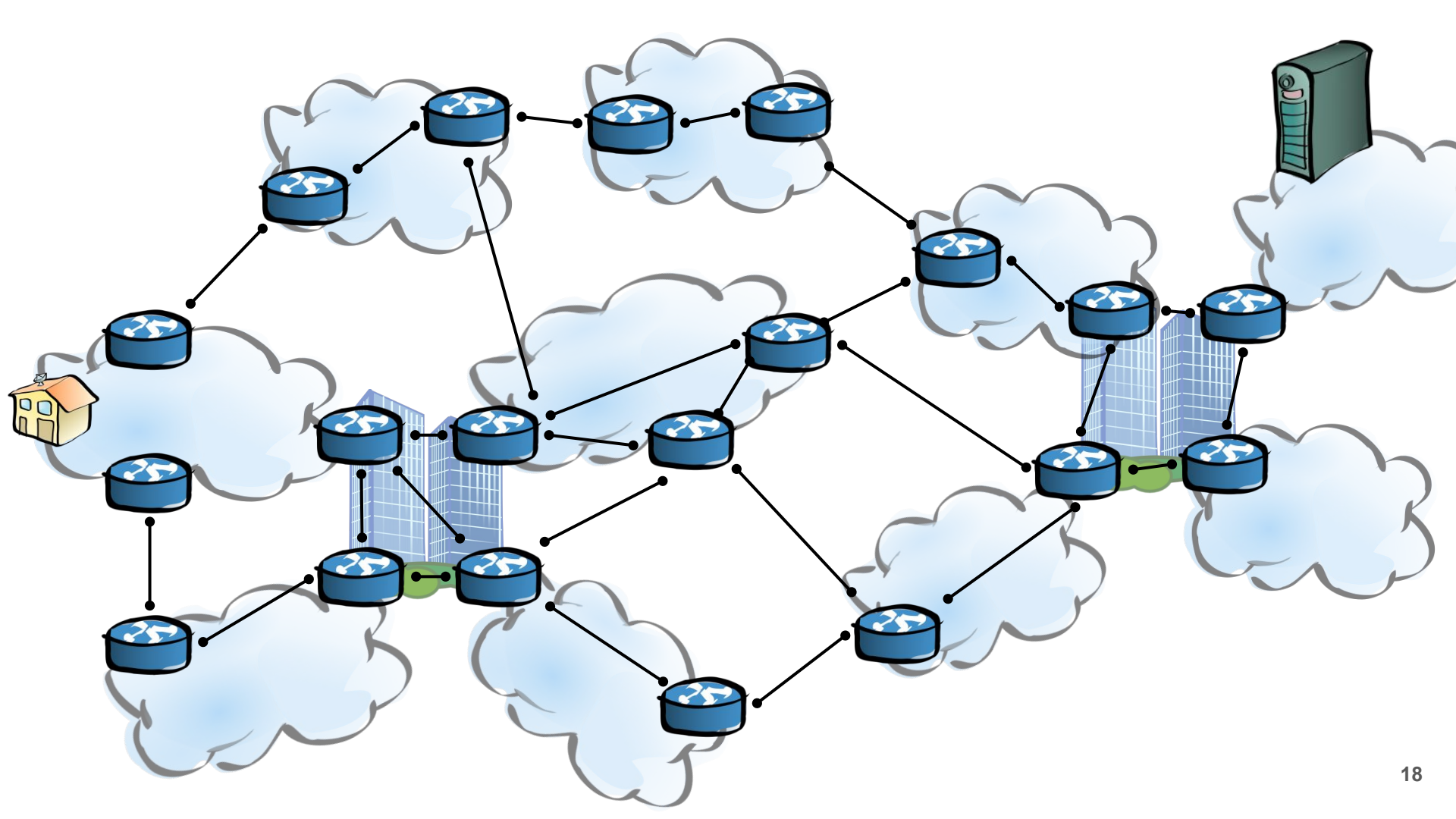

The Impact of Router Outages on the AS-level Internet

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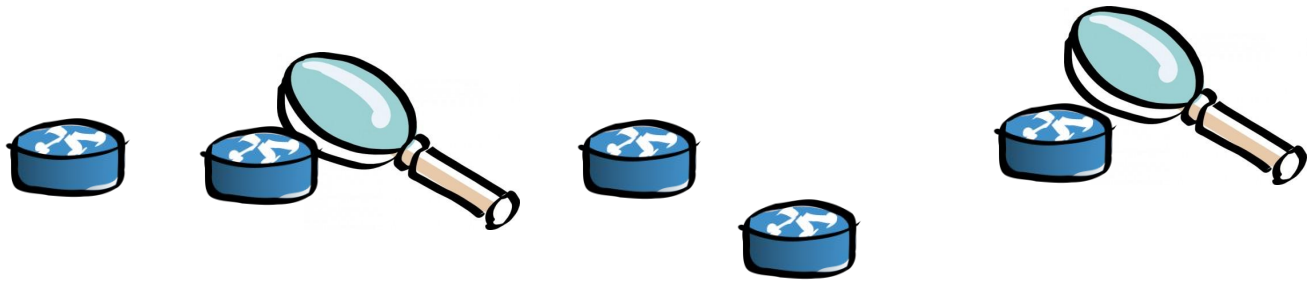

Identify, understand, and mitigate outages

Internet failures have significant impact

Impact of failures is hard to quantify

- Inconveniences users
- Costs money

We have limited information about failures

Limited understanding of the impact of failures

- What problems are going on or where
- Which routes or what traffic a failure will impact

Sensitive information

- SLAs and availability contracts
- Reputation

Lack of ground truth

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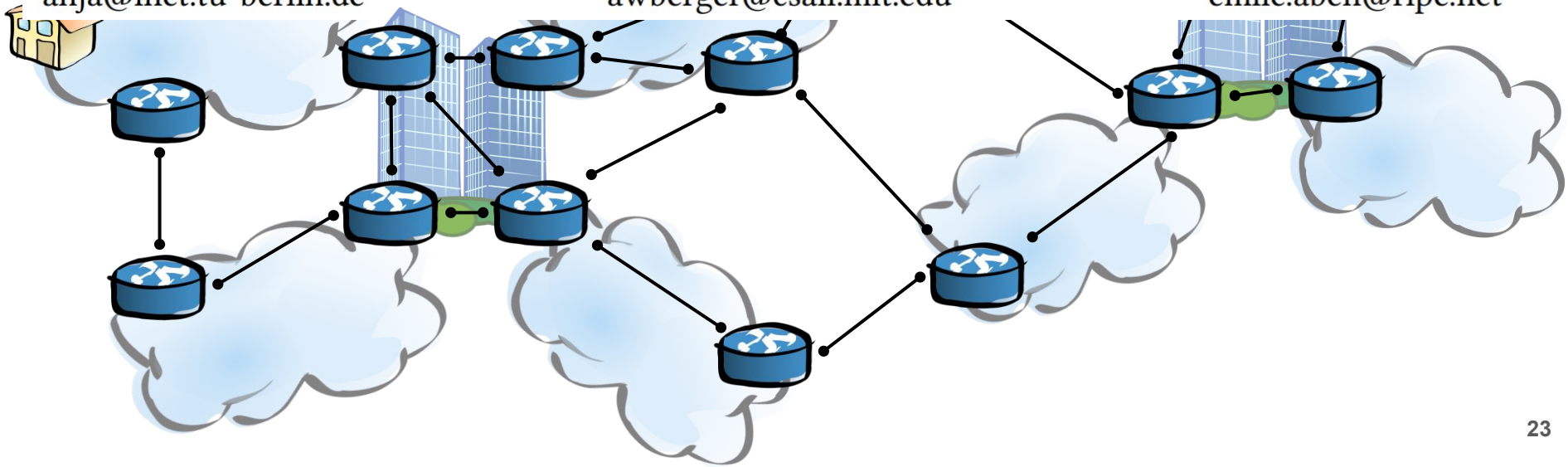

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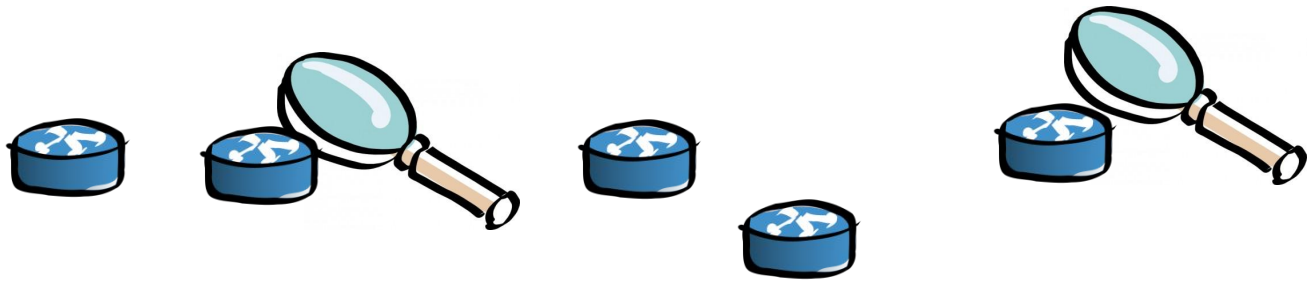

WIFT: Predictive Fast Reroute*

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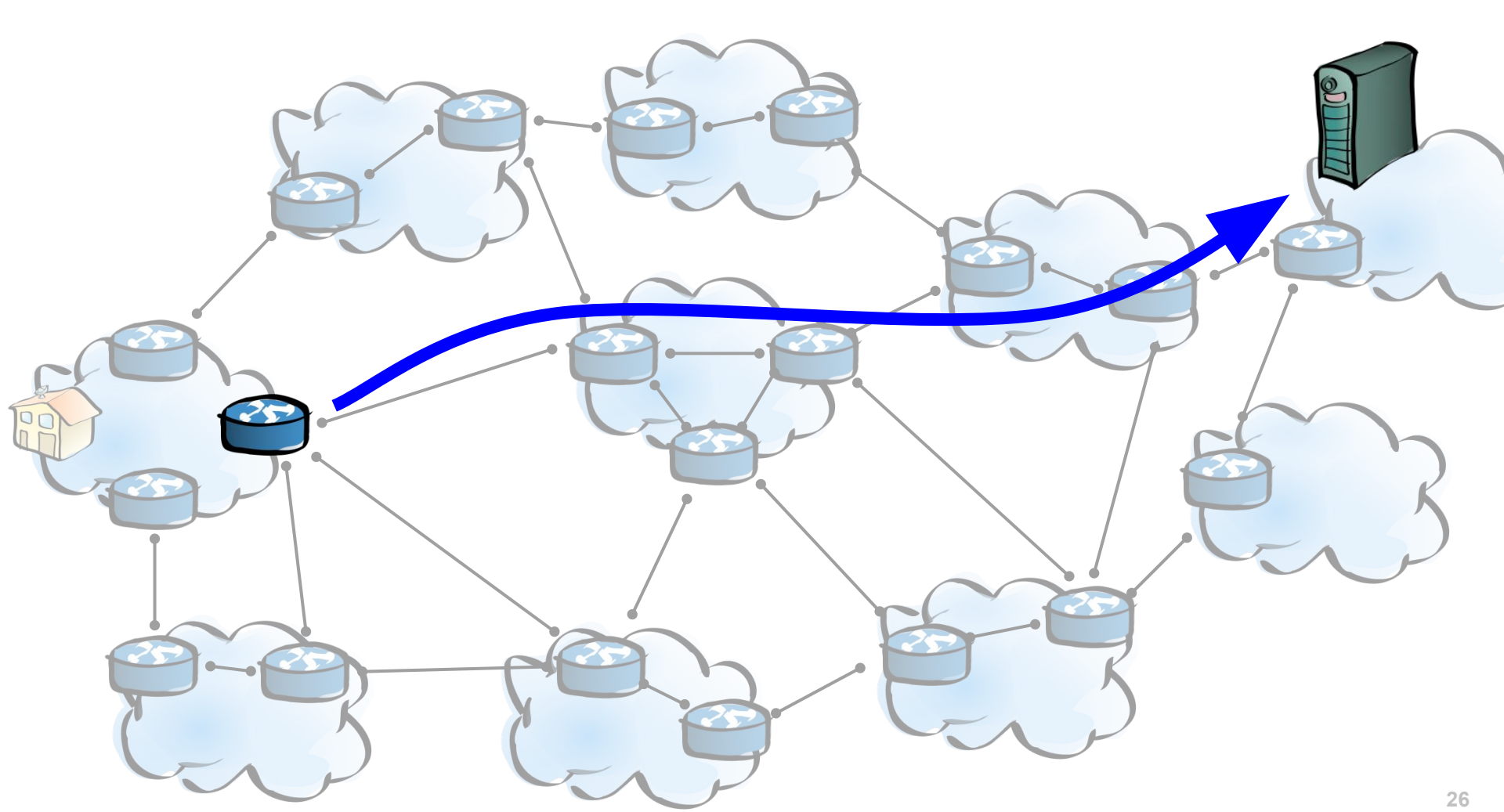

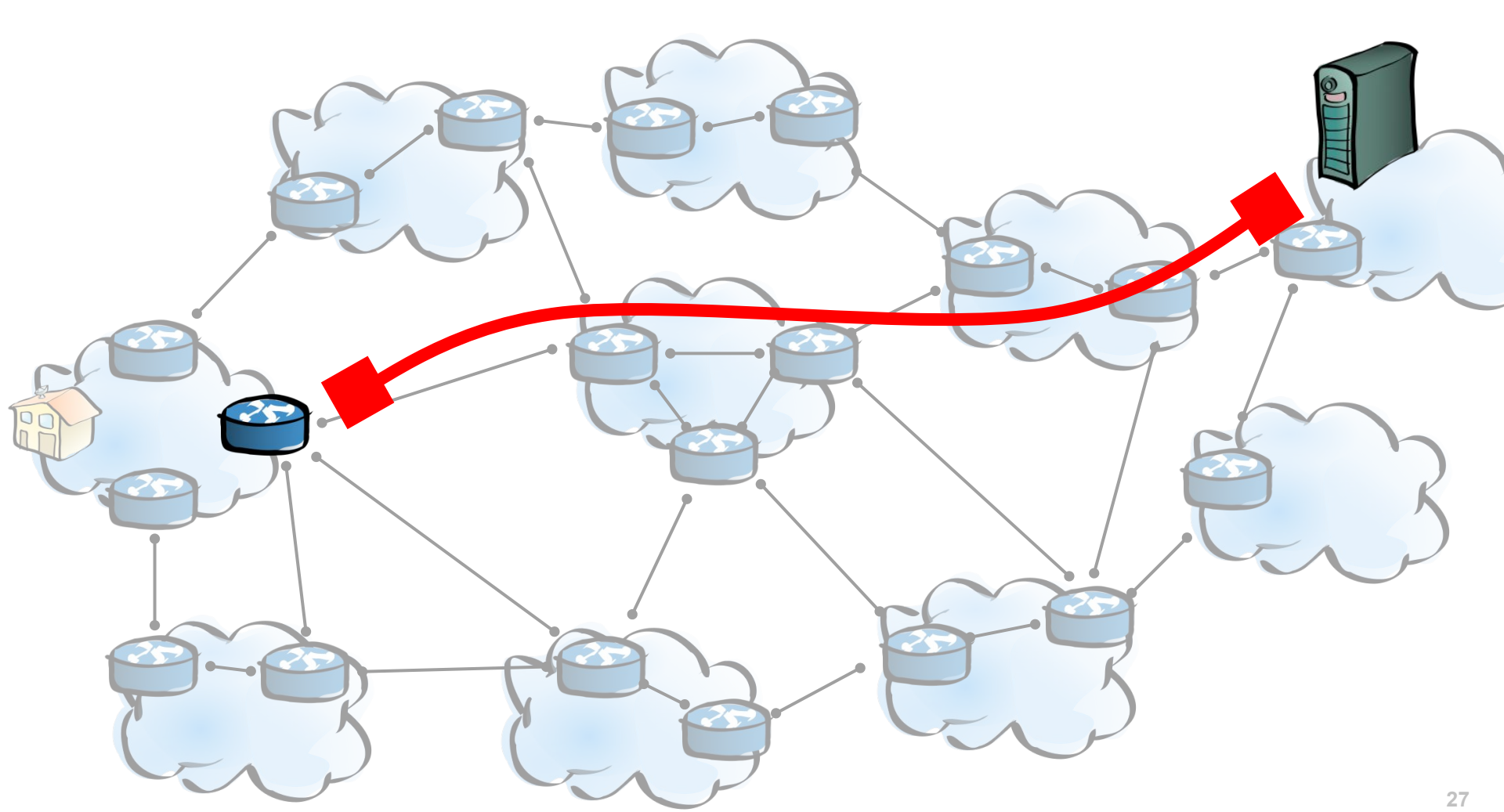

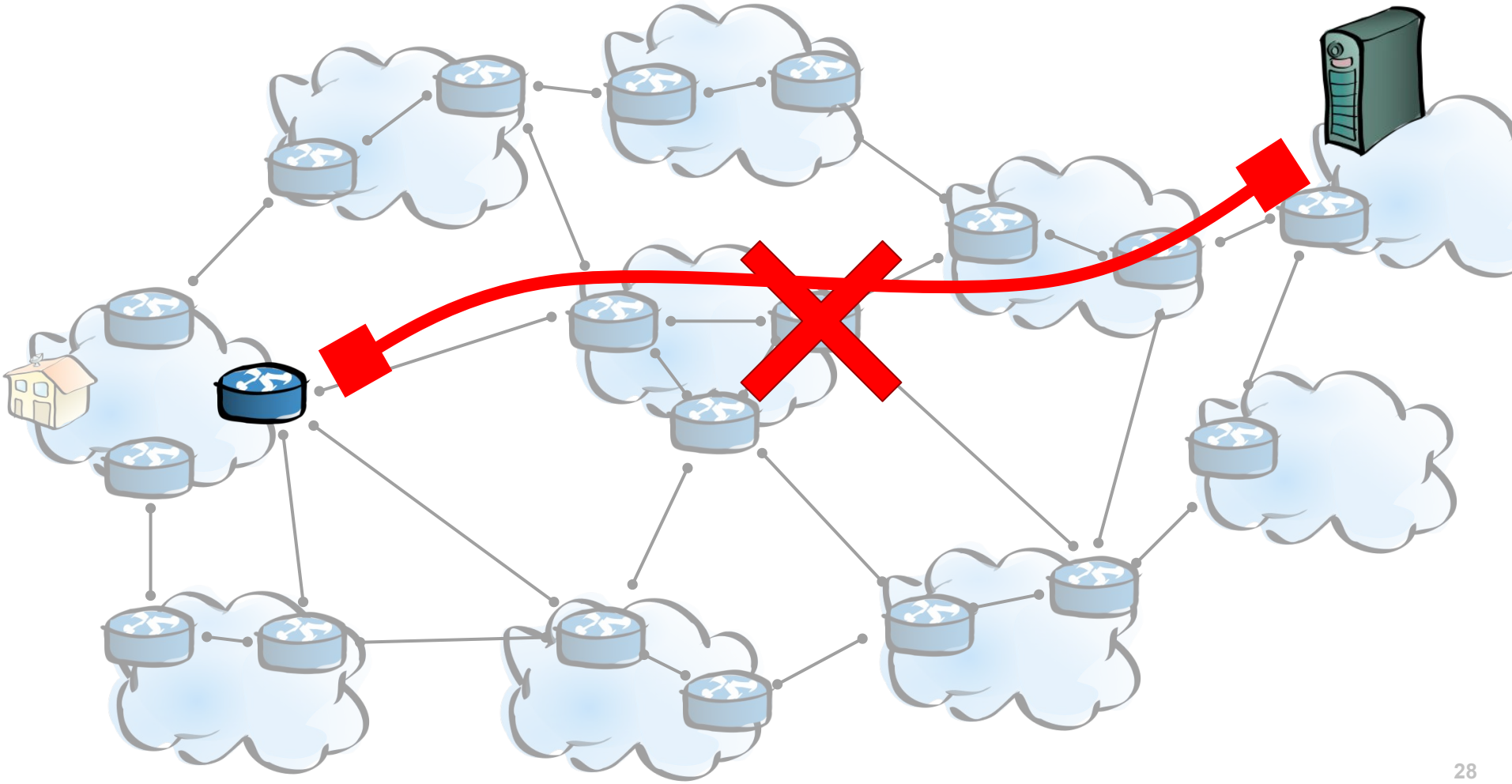

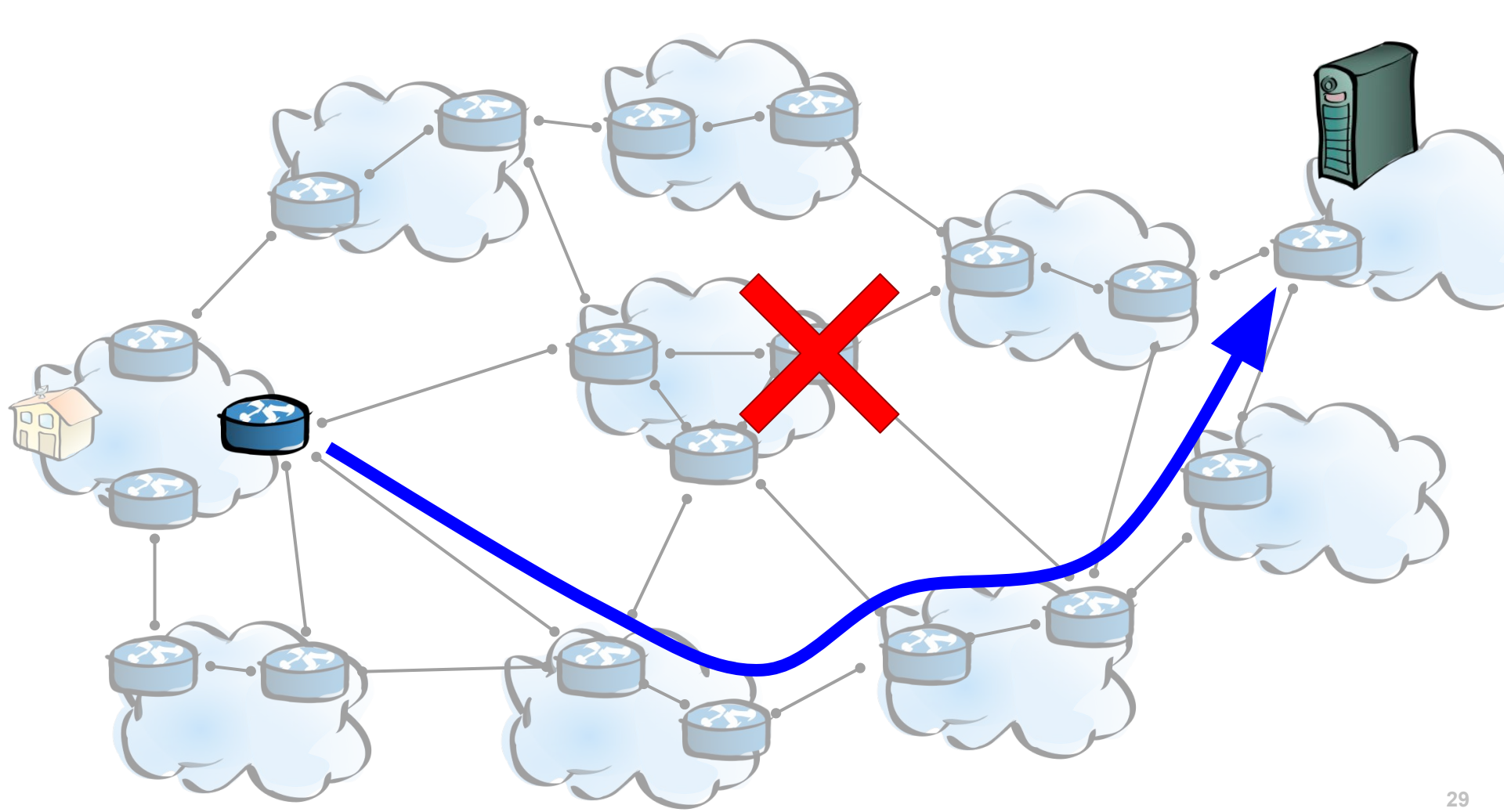

Things to look for in these papers

- Neat techniques to achieve their goals *today*
  - No control over routers
- How they scale to the whole Internet
  - Speed
  - Resource efficiency
- How they deal with measurement “noise”

How do these papers advance the state of the art?

- New measurement tools and data sources about routing
- Characterization of failures in the Internet
- New mechanisms to route around failures